The low values suggest that the size distribution with large particles dominates in the stratosphere.

(Received April 18, 1986)

MICROPHYSICS ON WINTER ENHANCEMENT OF ANTARCTIC STRATOSPHERIC AEROSOL: HYDRATION OF SULFURIC ACID DROPLETS (ABSTRACT)

Yasunobu IWASAKA[1], Yasuhiro MORITA[2] and Tomoyuki ITO[3]

[1] *Water Research Institute, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464*
[2] *Research Institute of Atmospherics, Nagoya University, 3-13, Honohara, Toyokawa 442*
[3] *Meteorological Research Institute, 1-1, Nagamine, Yatabe-machi, Tsukuba-gun, Ibaraki 305*

Backscattering coefficient and depolarization ratio of the Antarctic stratospheric aerosols were observed by a lidar at Syowa Station (69°00′S, 39°35′E) in 1983. Their values increased extremely as the winter progressed, which suggests that most of the stratospheric particles had nonspherical shapes (possibly ice crystal particles) in winter.

The freeze-out of ice from diluted sulfuric acid droplets is possibly an important process controlling the winter enhancement of Antarctic stratospheric aerosols.

(Received October 3, 1986)

OBSERVATIONS OF WAVE, MEAN-FLOW INTERACTIONS IN THE SOUTHERN HEMISPHERE TROPOSPHERE AND STRATOSPHERE: A COMPARISON WITH THE NORTHERN HEMISPHERE (ABSTRACT)

Koji YAMAZAKI

Meteorological Research Institute, 1-1, Nagamine, Yatabe-machi, Tsukuba-gun, Ibaraki 305

Characteristic features of the flow and wave, mean-flow interactions in the Southern Hemisphere troposphere and stratosphere are studied. An emphasis is placed upon the comparison of the stratospheric final warmings occurring in the two hemispheres. The dataset for this study consists of the NMC 1200 GMT analysis between 0.4 and 1000 mb during 1982. The transformed Eulerian mean diagnosis is used for examining the wave, mean-flow interaction.

The final warming occurred around March 31 in the Northern Hemisphere and around October 20 in the Southern Hemisphere. The final warming in the Southern Hemisphere is more rapid and intense, which is consistent with the fact that the planetary scale wave activity in the Southern Hemisphere is more intense than that in the Northern Hemisphere during the spring season.

In the Southern Hemisphere the polar easterly did not descend below 10 mb after the final warming, while the polar easterly kept descending to 50 mb in the Northern Hemisphere. The equatorial easterly in the lower stratosphere had extended and been connected to the polar easterly in the upper stratosphere of the Southern Hemisphere, while the connection was not observed in the Northern Hemisphere. It is found that both warmings were associated with the enhanced

planetary scale (wavenumber 1) wave activity. The full paper on this subject is to appear in Journal of the Meteorological Society of Japan, Vol. 65, No. 1.

(Received April 3, 1986)

EFFECTS OF MOUNTAINS ON THE JANUARY GENERAL CIRCULATION IN THE SOUTHERN HEMISPHERE: A NUMERICAL EXPERIMENT (ABSTRACT)

Akira NODA and Tatsushi TOKIOKA

Meteorological Research Institute, 1–1, Nagamine, Yatabe-machi, Tsukuba-gun, Ibaraki 305

Effects of mountains on the January general circulation in the Southern Hemisphere are investigated by use of a general circulation model (MRI.GCM-I) developed at the Meteorological Research Institute. The model uses staggered grids (Arakawa's C scheme) in the spherical coordinate space with the intervals 5° and 4° in the longitudinal and the latitudinal directions, respectively. The modified σ-coordinate is used in the vertical direction, where both the surface and the top ($=100$ mb) are coordinate surfaces. The atmosphere is divided into five layers. Four cases of numerical experiment are performed with all the mountains retained (M), all the mountains removed (NM), only Asian mountains removed (NAS), and only Rockies and Greenland mountains removed (NRG). Each case is integrated under the perpetual January condition for 210 days. The NM stationary field mainly represents thermal effects, while the difference field M-NM extracts orographic effects. Cross-equatorial response to the Tibetan Plateau forcing and the Rockies and Greenland mountains forcing is revealed in the difference fields M-NAS and M-NRG, respectively.

Middle latitudes in the Southern Hemisphere are dominated by thermally forced stationary waves with wavenumbers 2 to 4. The Antarctica forces wavenumber-1 stationary wave which has a structure similar to the thermally forced wavenumber-1 stationary wave found in high latitudes in the Northern Hemisphere. Mountains increase the net poleward eddy heat transport although a compensation effect is remarkable between the stationary eddy component and the transient component. However, they act as a cooler in the Southern (summer) Hemisphere. This may be attributed to the differences between M and NM in the vertical distribution of clouds and/or of albedos of snow. Cross-equatorial response in middle and high latitudes in the Southern Hemisphere is stronger to the Rockies and Greenland mountains forcing than to the Tibetan Plateau forcing.

(Received April 3, 1986)